

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

MEMORANDUM

DATE: January 22, 1996

SUBJECT: Transmittal of Final Five-Year Review Report
Old Mill Superfund Site, Rock Creek, Ohio

FROM: Debbie Siebers, RPM *7/LS*
Remedial Response Section #2

TO: Addressees

Attached is a copy of the final Five-Year Review Report for the Old Mill Superfund Site in Rock Creek, Ohio. Please contact me at (312) 353-9299 if you have any questions on the report or if you need any additional copies. Thank you for your assistance in the preparation of this report.

Attachment

Addressees:

Bruce Sypniewski, SF
Nola Hicks, ORC
Richard Smith, OEPA
Hugo Fleischman, EPA Headquarters
Frank Biros, DOJ
Esperanza Anderson, DOJ
Om Patel, Weston
Jennifer Wendel, SF (2 copies)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V
WASTE MANAGEMENT DIVISION
FIVE-YEAR REVIEW
OLD MILL SITE (ROCK CREEK, OHIO)

I. INTRODUCTION

The United States Environmental Protection Agency (EPA) has conducted a policy Five-Year Review of the Remedial Action (RA) performed at the Old Mill Site, Rock Creek, Ohio. The purpose of a five-year review is to ensure that a remedial action remains protective of public health and the environment and is functioning as designed. This document will become a part of the site file.

EPA Region V conducted this review pursuant to Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and as implemented by Section 300.430(f)(4)(ii) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), which require that periodic (no less often than every five years) reviews be conducted for sites where hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use or unrestricted exposure following the completion of all remedial actions for the site.

OSWER Directives 9355.7-02 (Structure and Components of Five-Year Reviews, May 23, 1991), and 9355.7-02A (Supplemental Five-Year Review Guidance, June 26, 1994) provide that EPA will conduct five-year reviews as a matter of policy at (1) sites where no hazardous substances will remain above levels that allow unlimited use and unrestricted exposure after completion of the RA, but the cleanup levels specified in the ROD will require five years or more to attain (e.g., long-term remedial action, or "LTRA" sites), and (2) sites addressed pre-SARA at which the remedy, upon attainment of the cleanup levels, will not allow unlimited use and unrestricted exposure. The five-year review of the Old Mill Site RA was conducted in accordance with this policy.

EPA has established a four-tier approach to conducting five-year reviews. EPA determines the level of review based upon site-specific considerations, including the nature of the response action, the status of on-site response activities, and proximity to populated areas and sensitive environmental areas. A Level I review was conducted at the Old Mill site, and consisted of (1) a review of documents associated with the RA, and (2) a site visit.

The RA at the Old Mill site was financed by EPA. The major components of the remedy consisted of removal of drums located on-site, excavation and off-site disposal of contaminated soil,

and installation of a ground water extraction and treatment system.

II. SUMMARY OF SITE CONDITIONS

A. Site Background

The Old Mill Superfund Site is located in the Village of Rock Creek, Ashtabula County, Ohio. The site consists of two parcels of land, the Henfield property and the Kraus property. The Henfield property is approximately 3 acres in size, and the Kraus property is approximately 10 acres in size. (See Figure 1.) The site is in a rural village setting with the closest residences approximately 75 feet from the property boundary. Land use in the vicinity of the site is represented by a mixture of residential, agricultural, and commercial/industrial developments. The Henfield property was the former location of a feed mill and later a potting soil operation.

Response activity at the Old Mill site began in 1979 when EPA and Ohio EPA learned that approximately 1,200 drums of toxic waste, including solvents, oils, resins, and polychlorinated biphenyls (PCBs), were stored on the two properties. A significant quantity of the drummed waste was flammable, and many of the drums were in poor condition and had leaked their contents into the soil.

Superfund emergency removal activities and enforcement action resulted in drum removal that began in November 1981 and was completed in October 1982. Some of the Potentially Responsible Parties (PRPs), who may have contributed to the contamination at the site, participated in removal activities by removing 580 of the drums.

Also under removal authorities, 80 cubic yards of contaminated soil was removed in November 1982 from the drum storage area of the Henfield property, and a fence was installed around a portion of the site in 1984.

The site was proposed for inclusion on the original National Priorities List (NPL) on December 30, 1982 (Federal Register, Vol. 47, No. 251, Page 58484). This list was made final on September 8, 1983 (Federal Register, Vol. 48, No. 175, Page 40673).

Between August 1983 and December 1984, a Remedial Investigation was conducted at the site. Soil on the Henfield and Kraus properties was found to be contaminated with organic chemicals, especially trichloroethene (TCE), as well as with heavy metals, such as lead. Ground water was contaminated with TCE and other organic chemicals.

In September 1983, notice letters were sent to approximately 30 PRPs giving notice of the Remedial Investigation/Feasibility Study (RI/FS) and requesting information regarding waste handling practices at the site. On February 23, 1984, a CERCLA Section 106 Administrative Order was issued to a former operator of the site requiring the installation of a fence around "hot spots" containing hazardous substances on-site. The former operator failed to comply with the Order, and EPA installed the fence to limit public access to the site. On November 2, 1984, demand letters were sent to several PRPs outlining their liability for payment of all past response costs as well as any other costs arising from remedial activities at the site. Negotiations were held, but no acceptable offers of settlement were received. EPA conducted the RA and is continuing to seek recovery of funds expended.

B. Results of Site Investigations

The activities performed during the original RI included installation of 14 ground water monitoring wells (7 more were installed during the supplemental RI field work), and collection, analysis, and evaluation of residential well water samples, soil and sediment samples, surface water and ground water samples, as well as samples of the railroad bed and railroad ballast found on-site. In addition, geophysical studies were conducted, and topographic maps were prepared for both the Henfield and Kraus properties.

The following is a summary of the results that were obtained from these studies, grouped by affected media. In general, the sampling activities indicated the presence of many contaminants to varying degrees in the soil, surface water, sediment, and ground water of both properties.

1. Soil

The Henfield property soil was found to have elevated levels of organic and inorganic contamination. Soil sampling activities conducted on the Henfield property showed surface soil on the west side of the property to contain the highest levels of inorganic (e.g., lead at 8,370 mg/kg) and organic (e.g., phenanthrene at 5,100 mg/kg) contamination observed on or around the Old Mill site. Organic contaminants were detected at elevated concentrations (e.g., phthalates at <1 to 22 mg/kg) down to 6 feet below ground surface.

The Kraus property soil had lower levels of contamination than did the Henfield property soil. Results from sampling indicated contamination by inorganics (e.g., cadmium at 323 mg/kg) and organics (e.g., naphthalene at 32.7 mg/kg).

2. Ground Water

Ground water contamination was found at the Old Mill site in both a shallow glacial till aquifer and a deeper weathered shale aquifer. (See Table 1; samples were collected on December 7 through 9, 1983; March 6, 1984; April 8, 1984; and July 11, 1984.) Ground water at the Henfield property, which flows primarily in a westward direction, was found to be contaminated with volatile organic compounds (VOCs), mainly TCE [up to 6,100 ug/l, or parts per billion (ppb)], with lower concentrations of tetrachloroethene, trans-dichloroethene, 1,1-dichloroethene, vinyl chloride, and 1,1,1-trichloroethane. Ground water at the Kraus property, which flows primarily northwestwardly, contained VOCs, mainly ethylbenzene and xylene. The Kraus VOC plume originally appeared to be confined to a small area on the east side of the Kraus property. During the RA, however, additional contamination was discovered on the Kraus property; this is discussed further in Section III.A of this report.

Sampling of nearby residential wells was conducted. Three wells near the site contained low levels of contamination, but it was not evident that this contamination was caused by migration of contaminants from the site. Two residences within 1/4 mile of the site which used ground water wells for their drinking water source were hooked up to the public water supply.

3. Surface Water and Sediments

Surface water and sediment studies found that the drainageways on both the Henfield and Kraus properties contained some contamination. Limited organic contamination was observed in the Henfield property drainageway surface water and sediment. Organic contamination was noted in the Kraus property drainageway, with the highest concentrations (e.g., polynuclear aromatic hydrocarbons at 3.9 mg/kg) noted at the sampling point farthest downstream.

A complete summary of the results of site sampling and analysis can be found in the final RI report (12/3/84) and the addendum to the RI report (5/31/85). A summary table of the RI/FS results is attached as Table 1.

III. SUMMARY OF RESPONSE ACTIONS

The Feasibility Study, which discussed various possible alternatives for remediating the contamination found on-site, was released for public comment on May 21, 1985. On August 7, 1985, consistent with the Initial Remedy Delegation Report of March 8, 1985, the Regional Administrator approved a Record of Decision (ROD) for the Old Mill site. The remedy selected for the site consisted of:

- Removal and off-site disposal of 95% of the contaminants in the soil (the amount of soil removed was 12,100 cubic yards);
- Demolition of buildings and silos located on the site and disposal of the debris;
- Ground water extraction and treatment (using air stripping and carbon adsorption) for an estimated period of 30 years, until a target ground water concentration of 10^{-5} was reached; and
- Placement of use restrictions on the ground water by the State of Ohio for as long as concentrations in the plume remain above a 10^{-6} carcinogenic risk level.

The design of this remedy was conducted from April 1986 through September 1987.

A. Remedial Action Construction Activities

The United States Army Corps of Engineers (USACE) conducted oversight of the RA, which was performed by their contractor, Aptus, Inc. The Notice to Proceed was issued to Aptus on April 28, 1988. On-site mobilization activities began during the week of May 9, 1988.

On-site excavation of contaminated soil began on the Kraus property; following site preparation activities on the Henfield property, excavation began there as well. Verification sampling was performed following excavation to ensure that Allowable Residual Contaminant (ARC) levels, or cleanup levels, were achieved. (These criteria are presented in Table 2.) If they were not, additional soil was removed. On portions of the Henfield property, it was decided to excavate to the clay layer plus three additional inches, to a total excavation depth of approximately 2.5 feet. In some areas, contamination persisted well into the barrier clay, and in other areas, well below the water table. By the end of the project, approximately 12,100 cubic yards of contaminated soil had been removed. The ROD originally estimated that 4,300 cubic yards would require removal.

Five dilapidated wooden buildings and four concrete silos located on the Henfield property were demolished and the debris shipped off-site. The portions of the debris that were found to be hazardous were shipped to the EnviroSAFE facility in Oregon, Ohio, while those that were non-hazardous were sent to the Doherty landfill in Geneva, Ohio.

Construction of the ground water extraction and treatment system began after most of the soil removal and building demolition was completed. The extraction system consists of trenches located on each property (see Figures 2 and 3), which collect contaminated ground water from the shallow aquifer, as well as one extraction well on the Henfield property and two extraction wells on the Kraus property. The extraction wells are 30 feet deep, and

capture contaminated ground water from the deep aquifer. The system had to be constructed differently than originally planned (i.e., trenches were used in place of shallow extraction wells) as a result of design studies which showed that shallow extraction wells could not effectively capture the contaminated ground water from the shallow aquifer. The original trench system also had to be extended. This was because during the removal of soil from the Kraus property late in 1988, additional contamination was discovered, northwest of the existing plume (northwest of the area referred to as "K-2" in some site documents). Further investigations, including a soil gas survey, were performed. Contaminants found in the Kraus ground water during these activities included vinyl chloride at 340 ppb, xylenes at 8,900 ppb, tetrachloroethene at 230 ppb, and TCE at 3,400 ppb.

The RA contractor was also responsible for building a treatment facility to treat the ground water which was extracted. A treatment plant capable of treating 10 gallons per minute (gpm) of contaminated ground water was built (the plant's normal operating rate is 5 gpm). The treatment plant includes a holding tank which collects ground water pumped from the extraction system. The water from the holding tank is pumped at a rate of 15 gpm through cartridge filters to an air stripper for removal of volatile organic compounds. A portion of the effluent from the air stripper (10 gpm) is recycled back to the holding tank and the remainder is pumped through cartridge filters to two-stage activated carbon columns. The final effluent is discharged by gravity to an underground storm water drain and ultimately flows to Rock Creek.

Compliance monitoring wells were also installed during the RA. Twenty-four wells were installed in all. Eight shallow and eight deep wells were installed on the Kraus property, while four shallow and four deep wells were placed on the Henfield property. The wells utilized during the RI were abandoned.

Following the removal of contaminated soil and debris, the site was backfilled with uncontaminated borrow soil, regraded to ensure proper drainage, and seeded to prevent soil erosion.

A Final Inspection was held on August 18, 1989, by EPA, the Ohio Environmental Protection Agency (OEPA), USACE, and Aptus. A punch list was developed, and final modifications were requested. All work was essentially completed on March 9, 1990. The USACE accepted the project as final from Aptus on June 29, 1990. EPA (on July 17, 1990) and OEPA independently inspected the site to determine that the modifications had indeed been made and that all items on the punch list had been addressed. The RA was determined to have been successfully executed.

It was later determined that a Remedial Action Report (RAR) was needed from the USACE before the Interagency Agreement (IAG) between EPA and USACE could be closed out. The USACE submitted a RAR signifying successful completion of construction activities. The report documents and discusses the 15 contract modifications which were issued throughout the project. Including the modifications, the total remedial action contract cost was \$5,074,831.65. The RAR was approved on April 24, 1991.

B. Long-Term Response Actions

1. Ground Water Compliance Monitoring

The ground water treatment system at the Old Mill site has been in operation for approximately 6½ years to date. The system has been operated by Roy F. Weston, Inc., an EPA contractor, since August 1989. The treatment plant has performed consistently well during this time.

Compliance monitoring wells are located on both the Kraus and Henfield properties. These wells are used to determine the levels of contamination that remain in the ground water. These wells have been sampled quarterly since October 1991. Selected compliance monitoring wells (an average of twelve wells are sampled) located within the ground water plume or on its boundary are sampled during March, June, and December of each year. Every monitoring well is sampled during the annual sampling which occurs in September; intercepting trench sumps and extraction well ports are also sampled during the annual sampling events. The treatment plant influent and effluent are currently sampled on a quarterly basis, but were sampled on a monthly basis for the first 2 years of plant operation. The influent, effluent, and ground water obtained from the monitoring wells are analyzed to determine the levels of volatile and semivolatile organic compounds they contain. A representative summary of the results obtained throughout the monitoring program during the annual sampling events is contained in Tables 3 and 4. Volatile organic compounds were detected frequently in only some of the monitoring wells located on the Kraus property; these results are provided in Table 3. Only very low levels of volatile organic compounds have been found in the monitoring wells on the Henfield property, and these wells are therefore not listed in Table 3. Diethylphthalate is the semi-volatile organic compound detected most frequently; however, it is found below levels which would be of concern to human health. It was found in several monitoring wells located on both the Henfield and Kraus properties as shown in Table 4. The treatment plant influent did not contain diethylphthalate.

In most cases, contamination in the water has been at expected levels. However, sampling results showed that shallow aquifer contamination levels at the north end of the Kraus property were

higher than expected. This indicated that the contaminated ground water was migrating beyond the trench system which was designed to capture it, and it became apparent that further work would be required in this area to fully remediate the ground water contamination problem. (Please note that the contaminated plume is located within the site property boundaries, and that there are no drinking water wells on the property. In addition, residents in the vicinity of the site obtain drinking water from the municipal water system.)

2. Additional Remedial Actions

In November 1992, an investigation utilizing a Recon^R system was conducted to determine the approximate boundaries of the volatile organic plume in the shallow aquifer of the Kraus property. Ground water samples were obtained over much of the Kraus property and analyzed on-site utilizing the Recon's^R mobile analytical equipment. The sampling results provided preliminary information as to where the extension to the trench system would need to be placed, to ensure that all contaminated ground water would be captured and treated at the on-site treatment plant.

To be certain that ground water flow directions were fully understood before the extension trench construction began, EPA installed piezometers (small wells) on the Kraus property in May 1993. Weekly water level measurements have been taken from these piezometers since then, and have ascertained that ground water in this portion of the site is still flowing to the northwest.

Utilizing the information from the piezometers and the Recon^R study, the optimal location for the extension trench placement was determined. The trench was constructed at the location shown in Figure 3. Construction of the trench began in May 1994, and the trench was fully operational by July 1994. The ground water in the monitoring wells installed downgradient of the new trench (RWSK-9 and RWSK-10) has been sampled five times since construction was completed. Only very low levels of contaminants were found in well RWSK-9 (e.g., up to 4 ppb of total 1,2-dichloroethene, and up to 2 ppb of TCE), indicating that the new trench has been successful thus far in halting the further spread of the contaminant plume in the northwest direction. In addition, piezometers located at the western edge of the site were sampled. While piezometer 1 (or P-1) did show some contamination (up to 59 ppb of total 1,2-dichloroethene and 80 ppb of TCE), and P-5 contained 3 ppb of total 1,2-dichloroethene, piezometers 6, 8, and 9 have tested clean, indicating that the plume has also been contained on-site in the western direction.

IV. REMEDIAL OBJECTIVES

A. Source Response Action

The source removal actions at the Old Mill site included removal of drums containing hazardous materials from the site, as well as excavation and off-site disposal of contaminated soil from the site. Allowable Residual Contaminant (ARC) Criteria, or cleanup levels, were calculated to determine the concentrations of contaminants which could remain in the soil without causing risk to human health and the environment. The remaining soil was sampled to ensure it met these levels; if not, further excavation ensued. The objectives of the response actions at the Old Mill site were to achieve protectiveness through prevention of exposure to contaminated surface soils, and to eliminate contaminant loading to the ground water. The response actions have been effective in meeting these objectives.

B. Ground Water Extraction and Treatment System

The ground water extraction system was designed to remove contaminated ground water from beneath the Old Mill site and to treat the water, eventually restoring the aquifer to the condition it was in before the contamination occurred. The system is also designed to prevent further migration of contamination both laterally and vertically into the deeper aquifer. ARC criteria were also set for the ground water.

Operational data from the system are reported on a monthly basis, and analytical results obtained from selected ground water monitoring wells are reported quarterly. During one quarter each year, all wells, sumps, and sampling ports are sampled, and an annual report summarizing contamination trends over the last year is produced.

As discussed in Section III.B, monitoring of the system indicated that hydraulic containment of the ground water plume was not being accomplished, so an additional extraction trench was constructed on the Kraus property. Initial sampling rounds have indicated that the plume has not migrated beyond this trench. Monitoring will continue in the future and further corrective measures will be taken if necessary.

The VOC concentrations in the extracted ground water have thus far not shown an appreciable reduction over time. Levels of contaminants remaining in the ground water are above the ARC criteria; they are also above the Maximum Contaminant Levels, or MCLs, promulgated after the ROD was written (as discussed in Section V below). An MCL is the maximum permissible level of a contaminant in water which is delivered to any user of a public water system. MCLs which have been exceeded at the site are shown in Table 6. Since these criteria have been exceeded,

additional ground water must be extracted and treated. The fourth annual performance evaluation report (Roy F. Weston, Inc., March, 1995) estimated that extraction of ground water for a period of 16.5 years from September 1989 would be necessary to meet the ARC goals; this would require extraction of 30.2 million gallons based on the daily average flow rate. As of September 1994, a total volume of 9.08 million gallons had been treated at the plant, an estimated 30% of the volume requiring treatment (see Table 5). As of September 1994, it was determined, based on the amount of contaminants found in the treatment plant influent, that 99.53 pounds of VOCs had been removed from the ground water, as shown in Table 5.

V. APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) REVIEW

Five-Year Review guidance established policy for EPA to review and analyze the RA at a site as it is affected by newly promulgated or modified Federal and State environmental laws. ARARs, as such, did not exist at the time the Old Mill ROD was written, since it was written prior to SARA. (However, the ROD did recommend that the technical aspects of the remedial alternative implemented at the Old Mill site be consistent with other applicable and relevant environmental laws.) Current policy requires that remedies must meet all identified applicable or relevant and appropriate Federal or more stringent State requirements. ARARs for the selected remedy are discussed below.

The provisions of RCRA applicable to remediation at Old Mill identified in the ROD were the 40 CFR Part 264 technical standards for closure, and the Subpart F Ground Water Protection Standards. RCRA requires that contaminated soil either be removed to background levels or another standard protective of human health and the environment, or be capped. The remedy selected at Old Mill was to remove soil to levels protective of public health and the environment. The ARC criteria, or cleanup levels, were determined based on risk calculations and comparisons to background levels of contamination found in soil.

As part of the five-year review process, these ARC criteria were examined to determine if they remain protective of human health and the environment. They were compared to U.S. EPA's generic Soil Screening Levels (SSLs), as seen in Table 2. SSLs are chemical concentrations in soil which represent a level of contamination that may warrant further study. Generally, when contaminant concentrations are below their respective SSLs, no further action is warranted (U.S. EPA, Regional Review of Draft Interim soil Screening (Trigger) Level Guidance, Office of Solid Waste and Emergency Response, 8/19/93.) All SSLs were found to be equal to or greater than their respective ARC criteria (indicating protectiveness of the ARC criteria under residential

exposure conditions) except for the following contaminants of concern: benzo(a)pyrene, arsenic, cadmium, and lead.

Further review of site files indicated that benzo(a)pyrene and arsenic cleanup levels were set based on background levels of these contaminants, so these two ARC criteria remain valid. A review of the data from the confirmation samples (samples which were taken to ensure that cleanup levels were met following site remediation) indicates that levels of benzo(a)pyrene and arsenic remaining at the site were below the established cleanup levels. A review of the confirmation sampling data for cadmium and lead indicates that levels of these contaminants remaining on-site were lower than both the ARC criteria and the SSL criteria in all cases. Through this process, it has been determined that the RCRA closure ARAR cited above continues to be complied with.

The ROD for the Old Mill site discusses containment of the contaminated ground water plume and treating of the water to a risk-based "target" Alternate Concentration Limit (ACL). The ROD states that 40 CFR section 264.94 requires that the concentration of a hazardous constituent must not exceed the background level of that constituent in the ground water, or an ACL for that constituent which will not pose a substantial present or potential hazard to human health or the environment as long as that ACL is not exceeded. The ROD stated that the acceptable level for ground water remediation is to a level which poses no greater than a 1×10^{-6} , or 1 in 1,000,000 excess cancer risk, but that under certain circumstances, levels other than 1×10^{-6} can be considered "target" ACLs. At the Old Mill site, reaching 1×10^{-6} levels was considered cost and time prohibitive, so "target" ACLs were established during the Remedial Design. These criteria represented the level of contamination which could remain in the ground water while posing an excess cancer risk of 1×10^{-5} , or 1 in 100,000, or less. The criteria were set only for those four contaminants for which the endangerment assessment had indicated an on-site concentration which exceeded the 1×10^{-6} excess lifetime cancer risk value or exceeded the allowable daily intake value which existed at the time. These levels were identified as ARC criteria, and it was estimated that it would require 30 years of ground water extraction and treatment to meet them. Then, the ground water would be allowed to attenuate naturally for an estimated 100 years after that, until the contamination which remained in the aquifer would pose an excess cancer risk of 1×10^{-6} or less. After operational data had been evaluated, "actual" ACLs (as opposed to "target" ACLs) were to be set. The ROD states that the remedy is to be considered "interim" until an "actual" ACL is set.

After the ROD was issued, MCLs for TCE and tetrachloroethene, the main contaminants of concern, and other VOCs found in site ground water, were proposed and finalized in the Safe Drinking Water Act (SDWA), 40 CFR Parts 141-143. The National Contingency Plan

(NCP) at §300.430(e)(2)(i)(B) and (C) (3/8/90) states that cleanup levels for restoration of ground water or surface water will be set at the Maximum Contaminant Level Goals (MCLGs) whenever these values are relevant and appropriate and are non-zero values. (MCLGs are non-enforceable concentrations of a drinking water contaminant that are protective of adverse human health effects and allow an adequate margin of safety; they do not take cost or feasibility into account, but are strictly health-based standards.) When the MCLG is equal to zero, the MCL is to serve as the cleanup level. For the contaminants of concern at the Old Mill site, the MCLGs are either zero or are the same as the MCLs, so MCLs will be the cleanup levels. The excess cancer risk level associated with most MCLs is 1×10^{-5} , which corresponds with the cleanup level required by the ROD. Since MCLs are now ARARs (they are relevant and appropriate as in situ cleanup standards where either surface water or ground water is or may be used for drinking water), the MCLs which are available will be used as cleanup criteria at the Old Mill site instead of creating site-specific "actual" ACLs for the contaminants. Where a contaminant has an ARC level but no MCL, the ARC criterion remains in effect.

The levels of contaminants found in the site ground water must be below the MCLs (i.e., below a carcinogenic risk level of 1×10^{-5}) before the treatment system can be turned off, and below a carcinogenic risk level of 1×10^{-6} before consumption of the water can be allowed again. The levels found at the Old Mill site still exceed these levels, but the consumption of ground water is not occurring. Therefore, the remedy continues to be in compliance with this SDWA ARAR. Representative levels of contaminants found in the ground water, the ARC criteria, and the current MCLs are presented in Table 6. Some basic calculations performed by Weston indicate that it may take up to three years longer to reach the MCLs as opposed to the existing ARC criteria, but, according to these calculations, the MCLs should still be reached within the 30 year treatment timeframe described in the ROD.

Contaminated ground water is extracted and treated prior to discharge by gravity to an underground stormwater drain which ultimately flows to Rock Creek. This activity is regulated by the requirements of the NPDES permit issued for discharge. The provisions of the NPDES permit were established by OEPA and EPA. The NPDES permit establishes site discharge limits for VOCs, which are monitored in accordance with the requirements of the permit, and reported to EPA and OEPA. Table 7 lists the ARC criteria for effluent from the treatment plant. The discharge limits have been consistently met.

The treatment plant removes volatile organic compounds from the extracted ground water during its treatment in the air stripper. The maximum and minimum amount of VOC removal during the

treatment plant operation since 1989 are 27.86 and 9.21 pounds per year, respectively. The estimated daily maximum and minimum emissions of VOC, based on the air blower capacity of 350 standard cubic feet per minute (scfm), are 0.069 and 0.023 mg/ft³ of air, respectively (or 2.44 and 0.81 mg/m³). There are no established standards for air emission from the air stripper, but the combined total emission of all VOCs calculated above is below the Permissible Air Exposure Limits for any single contaminant of concern found in the ground water and then emitted into the air during the air stripping process. (The Permissible Air Exposure Limits were listed in Table 4-7 of the RI report.) It appears, therefore, that the amount of air emissions from the treatment plant is extremely low and will not have any impact to residents living near the treatment plant.

The remedy for the Old Mill site continues to comply with ARARs.

VI. SUMMARY OF SITE VISIT

The Old Mill site has been visited by the EPA's Remedial Project Manager and the OEPA project manager numerous times. The most recent visits by the EPA project manager took place on May 23, 1994, and August 23, 1995. The purpose of the 1994 site visit was to observe the construction of the additional extraction trench, while the purpose of the 1995 visit was to attend a site meeting. During these visits, the current status of the site and the adequacy of the site cleanup were also observed. The treatment plant was functioning appropriately and was well-maintained. A site manager, employed by EPA's contractor, Roy F. Weston, Inc., works at the site on a daily basis and ensures that the treatment system is properly maintained. Repairs are made on an as-needed basis, and the EPA project manager is updated regarding site conditions regularly.

A. Site Use

The site is currently vacant, with the exception of the ground water treatment plant and monitoring wells. The land is grassed and is mowed frequently by the Weston on-site representative.

B. Ground Water Extraction System and Monitoring Wells

The system is inspected and routine maintenance performed on a daily basis by the Weston on-site representative. Each day's activity is recorded in a log book. Flow meter readings from the interceptor trench sump and extraction wells are recorded weekly. Daily readings are obtained from the flow meter within the treatment plant. Water levels in the piezometers and shallow Kraus monitoring wells are measured weekly. Every day, the operation of pumps within the interceptor trenches and extraction wells is checked. Ground water monitoring wells are capped and locked, and are in good condition.

VII. RECOMMENDATIONS

EPA recommends that the operation of the ground water extraction and treatment system continue. Based on regular inspections by EPA, OEPA, and EPA's contractor, Weston, it appears that the ground water remedy selected remains operational and functional. Review of ground water monitoring data indicates that TCE and other contaminants have been found at levels above the cleanup standards in several monitoring wells. TCE and other contaminants in ground water at levels above the cleanup criteria still represent a risk to human health, if ingestion of contaminated ground water were to occur. However, ground water at the Old Mill site is not being consumed.

It is the goal of the treatment system to contain the ground water contaminant plume beneath the site, and to reduce contaminant concentrations in the shallow and deep aquifers through extraction and treatment of the water. Continued monitoring of ground water wells and piezometers over time will enable data reviewers to determine the plume location and to take corrective measures if the plume should expand or begin moving in another direction.

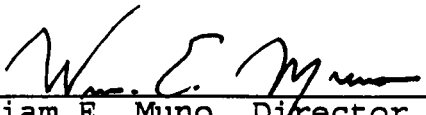
It is clear from the data that it will take several years to achieve a level of 5 ppb TCE (and the other cleanup criteria) in ground water using the current pump and treat system. In the future, it may become necessary to use other available technologies to speed up the ground water remediation. Future monitoring results, in combination with ground water modeling, will help to determine if this is the case. This issue will be addressed further in the next five year review.

VIII. STATEMENT ON PROTECTIVENESS

With the addition of the extraction trench and ground water monitoring wells on the Kraus property, the ground water extraction and treatment system remains both operational and functional. This system, in combination with the monitoring program and the lack of ground water consumption at the site, ensures adequate protection of human health and the environment. Source removal actions have been effective in eliminating exposure to contaminated debris and soil.

IX. NEXT FIVE-YEAR REVIEW

Hazardous substances, pollutants, or contaminants remain at the Old Mill site which do not allow for unlimited use or unrestricted exposure. EPA will conduct another five-year review by January 2001. It is anticipated that this future review will be a Level I review, consisting of review of ground water monitoring data and newly promulgated environmental laws.



William E. Muno, Director
Superfund Division

1/17/96
Date

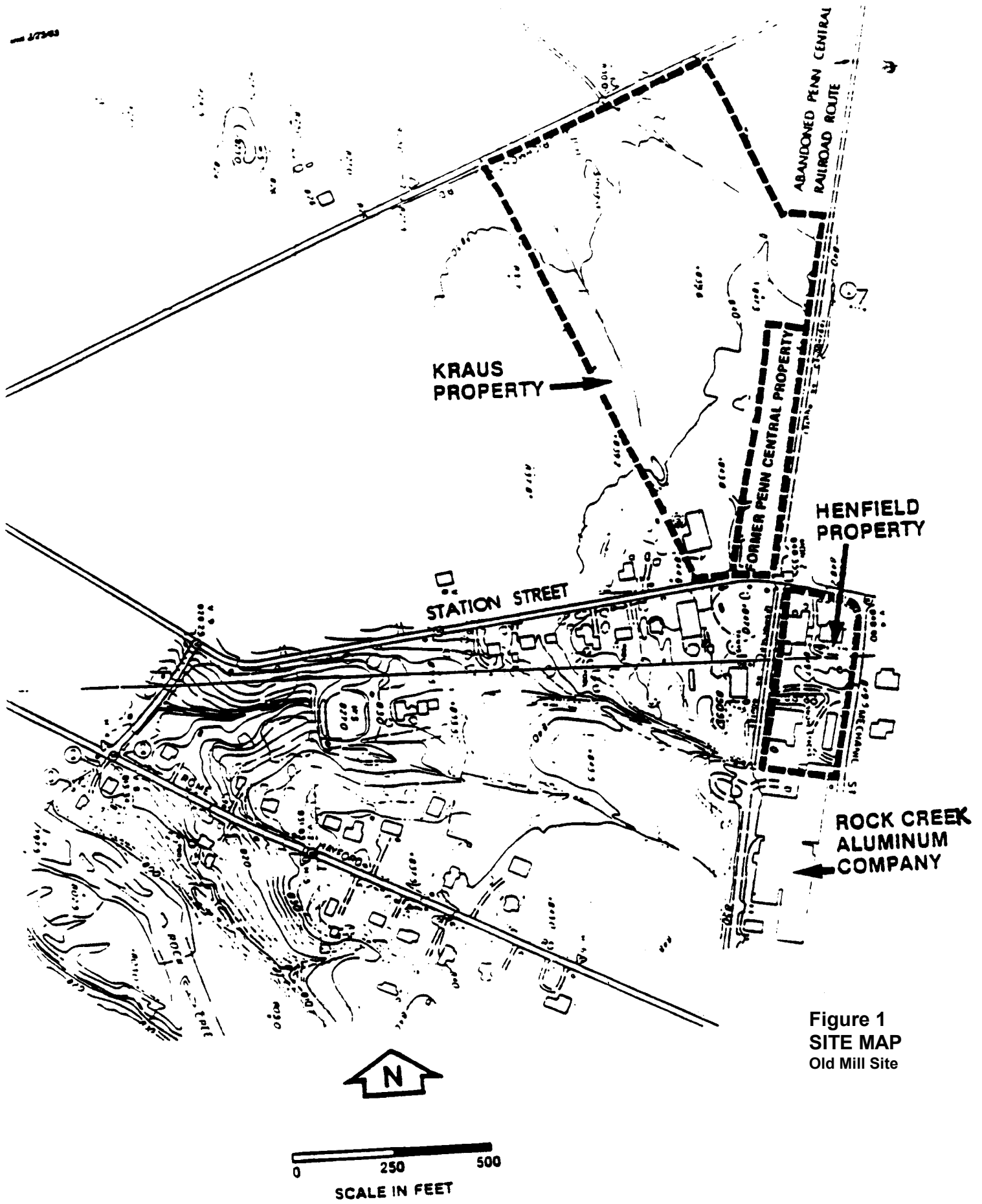
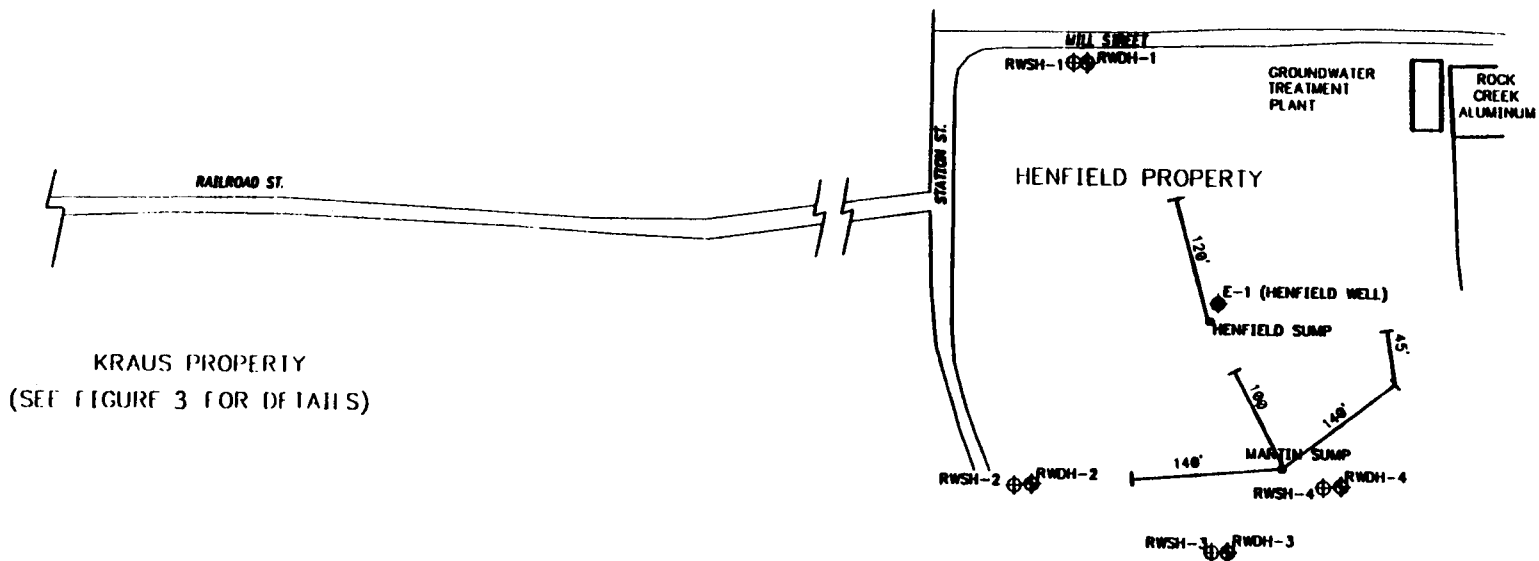


Figure 1
SITE MAP
Old Mill Site



KRAUS PROPERTY
(SEE FIGURE 3 FOR DETAILS)

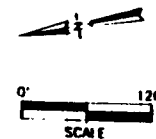
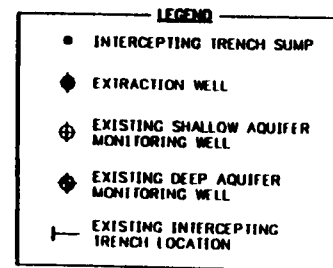
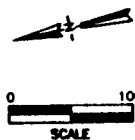


FIGURE 2

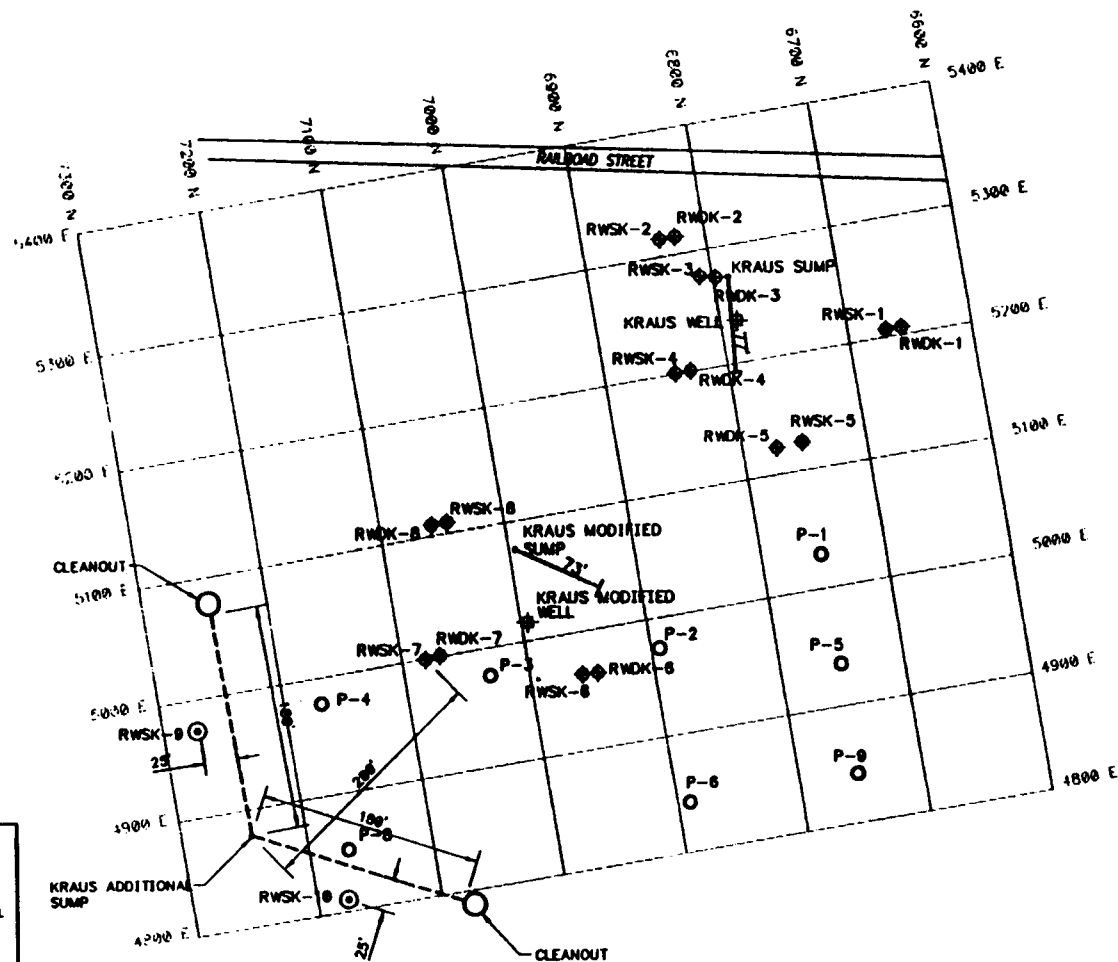
ALTERNATIVE REMEDIAL CONTRACTING STRATEGY
U.S. EPA CONTRACT No. 68-WB-0089
WORK ASSIGNMENT No. 017-SR25
DOCUMENT CONTROL No. 4500 17 AHYP

LOCATION OF EXTRACTION SUMPS/WELLS
AND MONITORING WELLS
HENFIELD PROPERTY, OLD MILL ST.
Rock Creek, Ohio



LEGEND

- EXISTING INTERCEPTING TRENCH SUMP
- ⊕ EXISTING EXTRACTION WELL
- ⬢ EXISTING SHALLOW AQUIFER MONITORING WELL
- ⬢ EXISTING DEEP AQUIFER MONITORING WELL
- EXISTING PIEZOMETERS
- EXISTING TRENCH
- - - ADDITIONAL TRENCH CONSTRUCTED IN JUNE 1994



ALTERNATIVE REMEDIAL CONTRACTING STRATEGY
 U.S. EPA CONTRACT No. 68-W6-0000
 WORK ASSIGNMENT No. 017-5R25
 DOCUMENT CONTROL No. 4500-17-AJZS

LOCATION OF EXTRACTION SUMPS/WELLS,
 MONITORING WELLS AND PIEZOMETERS
 KRAUS PROPERTY, OLD MILL SITE
 Rock Creek, Ohio

FIGURE 3

Table 1
RANGE OF CONTAMINANT CONCENTRATIONS AND DISTRIBUTION,
HENFIELD PROPERTY, OLD MILL SITE

Contaminant	Onsite Soil (mg/kg)		Offsite Soil(mg/kg)		Drainageway		Groundwater (ug L)	
	Surface	>1'	Surface	>1'	Sediment (mg/kg)	Surface	Offsite ^a Wells	Onsite ^a Wells
						Water (Ug/L)		
ORGANIC								
PNAs	7.4-13,440	0.106-196	1.7-9.29	1.18-36.8	U	U	U	U
Phenols	13-180	2.7-5.4	2.65	U	U	U	U	U
PCBs	0.0025-0.0173	0.003-11	0.0088	0.0814-0.19	0.069-0.248	U	U	U
Phthalates	3.70-3,700	0.91-11.68	0.610	0.66-120	2.94	U	U	56
Pesticides	U	U	0.192-0.735	U	0.0057-7.955	U	U	U
Trichloroethene	1.56-1,220	0.017-570	0.414-3.3	0.0049-0.22	U	22-97	89.9-6,100	1,100
Acetone	U	U	U	0.0518-18	0.032	49-280	U	127-1,1,000
Other Chlorinated								
Ethenes	0.405-554	U	0.005	0.016-0.099	U	7-135	14.9-490	U
Ethyl Benzene	0.019-1,420	U	U	U	U	U	22.2	U
INORGANIC								
Arsenic	102	31	★	★	★	U	122	U
Cadmium	1.47-152	8.7	0.99-1.93	0.57	0.63-1.54	1.1	U	1
Chromium	64-221	★	★	★	★	U	100	11
Lead	59-8,370	72-984	82-153	80	85.1	U	59	U
Nickel	22-353	24-59	21	26.3-29.5	24.7-26.6	U	U	40-45
Selenium	35	2.5-16	0.27-0.74	0.3-1.86	0.3-0.5	U	<2	2
Zinc	110-8,630	147-963	272	119-154	109-165	19-73	U	14-96

U = Undetected.

*Detected but not above background.

^aValues reported are of dissolved contaminants.

NOTE: Where only one value is given, contaminant was detected in only one sample above background or standard at the concentration shown. Contaminants are those that exceed the upper limit of the 95-percent confidence interval for background concentrations in soil or drinking water standards and criteria in water. Values for soil and sediment reported on a dry weight basis.

Table 1 (continued)
RANGE OF CONTAMINANT CONCENTRATIONS AND DISTRIBUTION,
KRAUS PROPERTY, OLD MILL SITE

Contaminant	Onsite Soil (mg/kg) ^a		Drainageway		Ground- water ^b (ug/L)
	Surface		Sediment ^a	Surface	
		>1'	(ug/kg)	Water (ug/L)	
ORGANIC					
PNAs	0.809-10	53.884	17.19-23.13	U	0.27-45.75
Phenols	5.5	U	U	U	10-580
PCBs	U	U	0.031	U	U
Phthalates	U	U	U	U	<0.2-<10
Pesticides	U	U	U	U	NA
Benzoic Acid	2.503	U	U	U	NA
Trichloroethane	<0.001	0.0068-0.11	U	U	<5-<100
Acetone	0.0055	0.003-0.125	U	U	<5-800
Chlorinated Ethenes	U	0.0465	U	U	<5-<100
Ethyl Benzene	U	0.0526-0.0686	U	U	<5-8,900
Total Xylenes	U	U	U	U	100-1,000
INORGANIC					
Arsenic	29	37-59	8.2-13.6	10	6-7
Cadmium	0.5-430	0.43	0.18-0.39	U	NA
Chromium	*	*	9.3-18.5	U	<20
Lead	64	110	13.3-20.8	U	<100
Nickel	23-27	24-48	18.8-47.1	U	NA
Selenium	0.25-1.0	0.5-0.7	0.14-0.36	U	<5-6
Zinc	115-274	300	74-138	11-35	8-37

* Detected but below background concentration.

^aValues are based on a dry-weight basis.

^bValues reported are of dissolved contaminants.

K - Compound detected but below quantification limit.

U - Undetected.

NOTE: Value before K is quantification limit.

Where only value is given, contaminant was detected in only one sample above background or standard at the concentration shown. Contaminants are those that exceed the upper limit of the 95-percent confidence interval for background concentrations in soil or drinking water criteria or standards in water.

NA - Not analyzed for.

D-CH2MHILL.1/HTB1-3.1

Table 2
Comparison of Soil Cleanup Levels to
Soil Screening Levels
Old Mill Site
Rock Creek, Ohio
(All Units in mg/kg)

Chemical	ARC ^a	SSL ^b
1,1,2,2-Tetrachloroethane	0.89	1.5 ^c
Tetrachloroethene	0.035	12
1,1,2-Trichloroethane	3.1	3.1 ^c
Trichloroethene	0.47	16
Benzo(a)pyrene	1.0	0.11
Aldrin	0.016	0.038 ^c
Fluoranthene	420	3100 ^c
4,4'-DDT	0.52	1.9
BHC (gamma)	0.13	0.49 ^c
PCB-1254	0.04	(1) ^d
PCB-1260	0.04	(1) ^d
Arsenic	28.6	0.37
Cadmium	170	39
Chromium	175	390
Lead	500	(400) ^e
Nickel	1500	1600
Selenium	100	390 ^c
Zinc	108	23,000 ^c

^a ARC = Allowable Residual Contaminant levels.

^b SSL = U.S. EPA Superfund Proposed Soil Screening Levels for residential land use (U.S. EPA, 1993).

^c SSLs based on procedure as defined in U.S. EPA 1993.

^d A preliminary remediation goal of 1 mg/kg has been set by U.S. EPA for PCB-1260 based on consideration of the nine criteria of the NCP.

^e Screening level for lead in soil for residential land use (U.S. EPA, 1994).

Table 3
Summary of VOCs in Treatment Plant Influent and Effluent and
in Selected Monitoring Wells During Annual Sampling
Old Mill Site
Rock Creek, Ohio

VOCs (ppb)	Treatment Plant		Compliance Monitoring Wells				
	Influent (S1)	Effluent (S5)	RWSK-3	RWSK-4	RWDK-5	RWSK-7	RWSK-8
1,2-Dichloroethene (total)	46/88/360/68	1U/1U/1U/1U	NS/1U/2/2	NS/58/610/1700	8/5/13/11	200/91/110/120	31/13/26/11
1,1,1-Trichloroethane	28/22/50/9	1U/1U/1U/1U	NS/1U/1U/1U	NS/2/3/5	1U/1U/1U/1U	1U/1/1U/1U	1U/1U/1U/1U
Trichloroethene	1900/1500/4900/790	1U/1U/1U/1U	NS/7/7/6	NS/250/520/780	1U/1U/1U/1	110/210/130/160	28/27/20/12
Tetrachloroethene	33/90/160/321	1U/1U/1U/1U	NS/1U/1U/1U	NS/1U/1U/1	1U/1U/10/1U	2U/1U/1U/1U	11/10/8/5
Vinyl chloride	1U/1U/1U/1U	1U/1U/1U/1U	NS/1U/1U/1U	NS/1U/2/14	2/2/3/1	2U/2/1U/1	2/3/1U/1U

Values indicated are for four annual sampling events - Oct. 91/Sept. 92/Sept. 93/Oct. 94

U - The compound was analyzed for, but not detected. The quantitation limit is reported.

NS - Not Sampled

S1 and S5 (2nd stage activated carbon effluent) are sampling locations at the treatment plant

RWSK - Monitoring wells installed in the Kraus property shallow aquifer

RWDK - Monitoring wells installed in the Kraus property deep aquifer

Table 4

**Diethylphthalate Levels in Selected Compliance
Monitoring Wells
Old Mill Site
Rock Creek, Ohio
(All Concentrations in ppb)**

Monitoring Well	Annual Sampling Events			
	First	Second	Third	Fourth
RWSH-1	6	11	4	19
RWDH-1	18	59	4	12
RWSH-2	59	6	2	20
RWDH-3	54	5	8	27
RWDH-4	15	17	4	11
RWSK-2	NS	8	0.5	19
RWDK-2	39	43	3	13
RWDK-3	130	14	5	15
RWSK-4	NS	3	NS	37
RWDK-4	13	29	2	27
RWDK-5	62	12	2	14
RWDK-6	22	24	4	20
RWDK-8	11	65	6	17

NS - Not sampled

RWSH - Monitoring wells installed in the Henfield property shallow aquifer

RWDH - Monitoring wells installed in the Henfield property deep aquifer

RWSK - Monitoring wells installed in the Kraus property shallow aquifer

RWDK - Monitoring wells installed in the Kraus property deep aquifer

Table 5

**Groundwater Flow and VOC Loading to Treatment Plant
Old Mill Site
Rock Creek, Ohio**

Operating Period	Groundwater Flow, Gallons	Total VOCs (pounds)¹
Sep 89 - Jul 90	2,017,553	23.44
Aug 90 - Jul 91	2,046,083	27.86
Aug 91 - Sep 92	1,652,577	13.88
Oct 92 - Sep 93	1,804,125	25.14
Oct 93 - Sep 94	1,559,235	9.21
Total	9,079,573	99.53

¹Sum of 1,2-Dichloroethene, 1, 1, 1-Trichloroethane, Trichloroethene, and Tetrachloroethene as measured at the treatment plant influent (sampling location S1).

Table 6
Representative Levels of Contaminants in Groundwater Exceeding Criteria
Old Mill Site
Rock Creek, Ohio

Contaminants	ARC Criteria, ppb	MCL ¹ , ppb	Compliance Monitoring Wells ²			
			RWSK-3	RWSK-5	RWSK-7	RWSK-8
1,1-Dichloroethane	1.9	NONE	*	3/1/1U/NS	6/5/2/3	*
1,2-Dichloroethene ³	NONE	cis=70/trans=100	*	NS/58/610/1700	200/91/110/120	*
1,1,1-Trichloroethane	NONE	200	*	*	*	*
Trichloroethene	15	5	NS/7/7/6	NS/250/520/780	110/250/520/780	28/27/20/12
Tetrachloroethene	8.2	5	*	*	*	**
Ethylbenzene	8000	700	**	**	**	2/3/1U/1U
Vinyl chloride	NONE	2	*	NS/1U/2/14	2U/2/1U/1	

Values indicated are for four annual sampling events - Oct. 91/Sept. 92/Sept. 93/Oct. 94

- 1 - Maximum Contaminant Level
- 2 - Wells with exceedance of contaminant's criteria (ARC and/or MCL)
- 3 - Amount of contaminant found in well is the sum of the amounts of cis and trans isomers found. Since only total 1,2-dichloroethene was measured, any level found above 70 ppb may have exceeded the MCL for cis-1,2-dichloroethene,
- U - The compound was analyzed for, but not detected. The quantitation limit is reported.
- NS - Not sampled.
- * - ARC & MCL criteria not exceeded.
- ** - Never detected.

Table 7
Treatment Plant Discharge Criteria
Old Mill Site
Rock Creek, Ohio

Parameter	Discharge Criteria (ppb)
Trichloroethene	1.9
Tetrachloroethene	4.1
1,1,1-Trichloroethane	3.8
Acetone	100
Ethylbenzene	7.2
Phthlates	2.5
Phenols	1.5
Vinyl chloride	1.0
1,1-Dichloroethene	2.8
1,1-Dichloroethane	4.7
Trans-1,2-dichloroethene	1.6
Chloroform	1.6
Total xylenes	1.0
Benzoic Acid	2.0
Methylene chloride	2.8